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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/629,430

07/29/2003

Jae-Hyoung Choi

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03/07/2006

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EXAMINER

GEYER, SCOTT B

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/629,430

Applicant(s)

CHOI ET AL.

Examiner

Scott Geyer

Art Unit

2812

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-14 and 16-23 is/are pending in the application.
- 4a) Of the above claim(s) 2,5-8,16,17,19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4,9-14,18 and 21-23 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claims 2-14 and 16-23 are pending in the instant application, with claims 2, 5-8, 16, 17, 19 and 20 being currently withdrawn.

Claims 3, 4, 9-14, 18 and 21-23 are treated on their merits below. Withdrawn claims will be rejoined and also allowed at such time when the independent claims are determined to be allowable.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 22, 2005 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites a thermal treatment step on a second conductive layer and a dielectric layer at a temperature "of at least about 400°C" in lines 10-11. In lines 12-14, the thermal process is again recited to be performed on the second conductive layer and the dielectric layer "at a temperature in the range of about 450°C to 600°C". This range-within-a-range recitation within the same claim renders the claim indefinite. For purposes of examination, the examiner will assume the thermal treatment temperature to be the first recitation which is at a temperature "of at least about 400°C".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 4, 9-11, 13 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by the applicant's admitted prior art (AAPA).

As to **claim 4**, AAPA teaches forming a first conductive layer on a substrate, a dielectric layer upon the first conductive layer and a second conductive layer upon the dielectric layer. Portions of the second conductive layer and the dielectric layer are then removed which exposes portions of the first conductive layer. A thermal process is then performed at a temperature of at least about 400 degrees Celsius (see applicant's specification page 2, lines 1-21).

As to **claim 9**, AAPA teaches the first conductive layer to be platinum (applicant's specification page 2, line 3).

As to **claim 10**, AAPA teaches the second conductive layer material to be the same as the material of the first conductive layer (applicant's specification page 2, lines 14-15).

As to **claim 11**, AAPA teaches the dielectric layer to be tantalum oxide (applicant's specification page 2, line 3).

As to **claim 13**, AAPA teaches dry etching to remove portions of the second conductive layer and the dielectric layer (applicant's specification page 2, lines 16-17).

As to **claim 14**, AAPA teaches performing a thermal process on the second conductive layer and the dielectric layer after portions of those two layers have been removed (applicant's specification page 2, lines 15-21).

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Iijima et al. (6,664,157 B2).

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As to **claim 12**, AAPA teaches tantalum oxide used as a dielectric layer as noted above for claim 11. However, AAPA does not teach depositing tantalum oxide at a temperature in the range of about 380°C to 500°C using chemical vapor deposition (CVD). However, Iijima et al. teach CVD deposition of tantalum oxide at a temperature of 440°C (see column 19, lines 40-52). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify AAPA with tantalum oxide deposition as taught by Iijima et al. so as to provide excellent step coverage.

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Claim 18, 21, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Hosoda et al. (6,797,560 B2).

As to **claim 18**, AAPA teaches forming a first conductive layer on a substrate, forming a tantalum oxide dielectric layer upon the first conductive layer and a second conductive layer upon the dielectric layer. Portions of the second conductive layer and the tantalum oxide dielectric layer are then removed which exposes portions of the first conductive layer. AAPA also teaches thermal process performed at a temperature of at least about 400°C (see applicant's specification page 2, lines 1-21).

AAPA does not teach maintaining the tantalum oxide in an amorphous state during the thermal process.

However, Hosoda et al. teach utilizing tantalum oxide as the dielectric layer within a capacitor. Further, Hosoda et al. teach maintaining the tantalum oxide dielectric layer in its amorphous form, and that tantalum oxide will remain in its amorphous form as long as thermal annealing does not go above about 700°C. Further, Hosoda et al.

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teach that if tantalum oxide is thermal annealed above 700°C, that it will crystallize and become deficient in oxygen which would lower its insulating effect (see column 1, lines 5-54).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify AAPA with tantalum oxide remaining in amorphous form as taught by Hosoda et al. so as to retain the insulating properties of tantalum oxide as a dielectric layer.

Further, although neither AAPA nor Hosoda et al. teach the temperature range recited in the claim, which is "about 450°C to 600°C", the examiner notes that the applicant does not teach the cited temperature range solving any problem or being for any particular purpose. Therefore, the cited temperature range lacks criticality in the claimed invention and does not produce unexpected or novel results. This is especially noted since the prior art explicitly teaches that tantalum oxide will crystallize at temperatures above 700°C and it would appear that the cited range is only included to indicate that the tantalum oxide will remain amorphous, which is simply a specific property of the chemical material. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the thermal process at a temperature range of "about 450°C to 600°C", since that would maintain the tantalum oxide material in an amorphous state, and because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233, MPEP 2144.05 II A.

As to **claim 21**, AAPA teaches the first conductive layer to be platinum (applicant's specification page 2, line 3).

As to **claim 22**, AAPA teaches the second conductive layer material to be the same as the material of the first conductive layer (applicant's specification page 2, lines 14-15).

As to **claim 23**, Hosoda et al. teach CVD deposition of tantalum oxide at a temperature range of 300°C to 600°C (see column 3, lines 37-52).

Response to Arguments

Applicant's arguments filed December 22, 2005 have been fully considered but they are not persuasive. In the applicant's remarks, which are presented on pages 8 and 9 of the response filed on 12-22-05, the applicant argues limitations within claims 1 and 15. However, claims 1 and 15 were cancelled by the applicant. Further, the applicant argues a limitation in the third paragraph which includes "...without performing a thermal process to sure the dielectric layer...", but that limitation is not present in any of the pending claims. Since the applicant is arguing claims that have been cancelled, the arguments are not found persuasive.

Allowable Subject Matter

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

This action is **non-final**.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Geyer whose telephone number is (571) 272-1958. The examiner can normally be reached on weekdays, between 10:00am - 6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Handwritten signature of Scott B. Geyer and the date 3/3/06.

Scott B. Geyer
Primary Examiner
March 3, 2006